

## SPECIES OF THE GENUS *ORTHOGONIUS* MACLEAY (COLEOPTERA, CARABOIDEA) FROM BHUTAN AND SIKKIM

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**Abstract** Species of the genus *Orthogonius* Macleay from Bhutan and Sikkim are treated. In the region, only one species (*O. opacus* Schmidt Göbel) has been recorded. Three species are described as new to science: *O. himalayicus* sp. nov., *O. dureli* sp. nov. and *O. longiphallus* sp. nov. A key to species from Bhutan and Sikkim is also provided.

**Key words** Coleoptera, Caraboidea, Orthogoniini, *Orthogonius*, new species, Bhutan, Sikkim.

Up to now, three species of the genus *Orthogonius* Macleay (Coleoptera, Carabidae, Orthogoniini) have been recorded from Himalayan Region. *O. opacus* Schmidt Göbel was the first species known from Sikkim (Andrewes, 1923). Two species, namely, *O. kumatai* Habu and *O. nepalensis* Habu, were described from Nepal in 1979 (Habu, 1979). In the present paper, three new species are described and illustrated from Bhutan and Sikkim.

**Abbreviations.** IRSNB: Institut royal des Sciences naturelles de Belgique, Brussels, Belgium; MNHN: Muséum National d'Histoire Naturelle, Paris, France; NHML: the Natural History Museum, London, UK; SCAU: South China Agricultural University, Guangzhou, China.

*Orthogonius himalayicus* sp. nov. (Figs. 1, 4, 7–8, 13)

Length (from apex of mandibles to apex of elytra): 24.0–27.0 mm; width (greatest width of elytra): 10.5–12.0 mm. Habitus as in Fig. 13.

Head and pronotum black, antennae, palpi, elytra and lower side dark brown. Body slender and very shiny.

Head convex, with rather long, glabrous neck; frontal impressions small and short; clypeal sulcus fine, front margin of labrum deeply emarginate; eyes comparatively small, but prominent; ligula narrow, slightly dilated at apex, bisetose; paraglossae broad, beyond ligula; labial palpomere 2 bisetose in inner margin, slightly longer than palpomere 3; maxillary palpomere 3 a little shorter than palpomere 4. Antennae moderately long, reaching beyond shoulder of ely-

tra, pubescent and dorsal-laterally dilated from antennomere 4; antennomere 1 longer than 3, and twice as long as 2, other antennomeres subequal.

Pronotum markedly transverse (W/L: 1.9), rather flat, lateral marginal bead wide and reflexed, widest at middle, bordered at base and apex, base wider than apex, both fore and hind angles broadly rounded, disc slightly convex, median line clear, basal foveae deep.

Elytra rather long (L/W: 1.75), parallel-sided, somewhat convex, shoulders quadrate, bordered at base, widest slightly behind middle, apex obliquely truncate, without outer angles, inner angles roundly obtuse (Fig. 1); striae very deep, intervals distinctly convex, 2 to 6 subequally wide; intervals 3 with four setiferous pores, basal two located near stria 3, other two (middle and subapical ones) near stria 2.

Legs stout, fore tibia dilated at apex, outer angle long and sharp; length ratio of hind tarsomeres 1–4 as 1.0: 0.7: 0.4: 0.4, tarsomere 4 deeply bilobed; all claws pectinate.

Prosternal process unbordered at apex, sternites 4–6 each with one pair of setae, sternite 7 with two pairs; apical margin of sternite 7 weakly emarginate in male (Fig. 4).

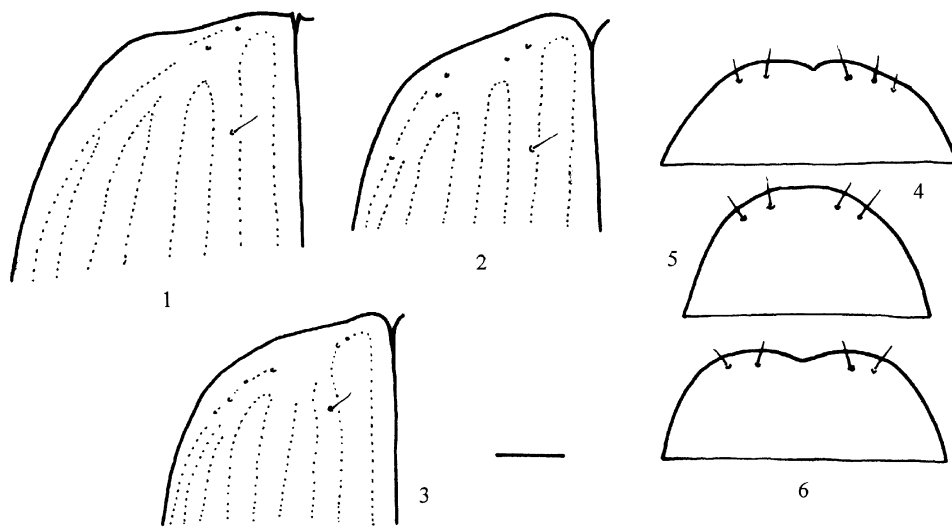
Microsculptural mesh patterns isodiametric.

Male genitalia. The median lobe of aedeagus comparatively small and short, middle portion convex, apex pointed in profile, turning to right, obtuse dorsally (Figs. 7–8).

Remarks. This new species is similar to *O. deltuus* Schmidt Göbel, 1846, but can be separated from the latter by: prosternal process unbordered at apex,

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Figs 1-6. Apex of right elytra (1-3) and sternite 7 of male (4-6) of *Orthogonius* spp. 1, 4. *O. himalayicus* sp. nov. 2, 5. *O. dureli* sp. nov. 3, 6. *O. longiphallus* sp. nov. Scale bar= 1 mm.

sternite 7 weakly emarginate in male, head moderately wrinkled, and pronotum with broad hind angles.

Holotype ♂, "British Bootang, L. Durel, 1898", deposited in MNHN. Paratypes: 2 ♂♂, "Pe-dong A. Desgodins"; 1 ♂ and 2 ♀♀, "British Bootang, Maria Basti. L. Durel"; 1 ♂, "Sikkim"; 1 ♀, "Museum Paris, Bhutan. R. Oberthür, 1900", all in MNHN except one male in SCAU.

Etymology. Toponym, refers to the type locality.

Distribution. Bhutan and Sikkim. Known only from the type localities.

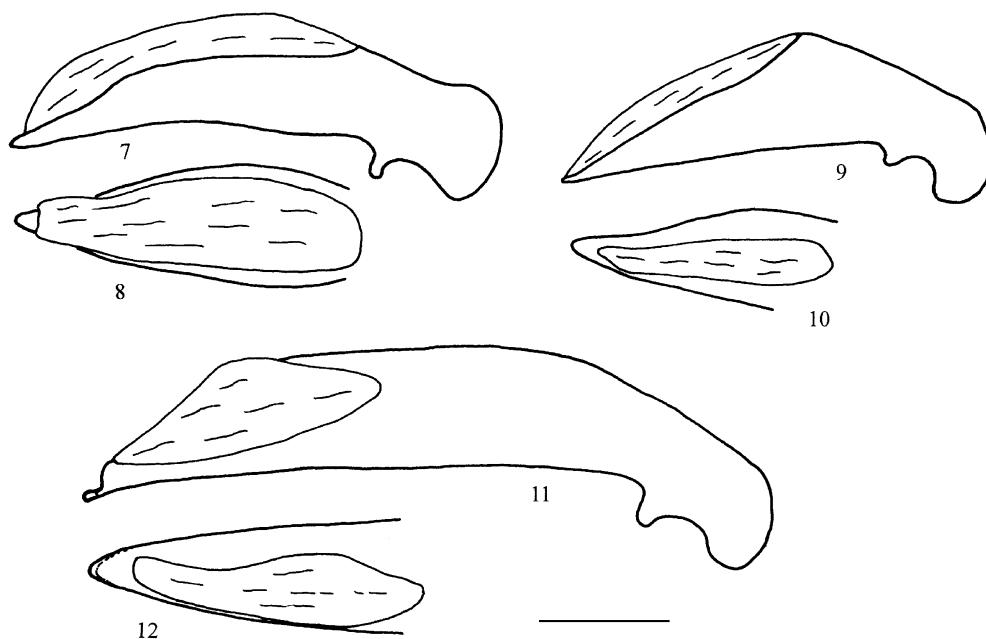
*Orthogonius dureli* sp. nov. (Figs. 2, 5, 9-10,

14)

Length: 17.0 mm; width: 7.5 mm. Habitus as in Fig. 14.

Body shining; black or dark brown, but clypeus, labrum, palpi of mouthparts and apical antennomeres red brown.

Head slightly convex, surface with deep intricate wrinkles, two supraorbital setae on either side; frontal impressions deep; clypeus bisetose; labrum sexsetose, with frontal margin slightly emarginate; eyes large, prominent; ligula small and narrow, slightly dilated at apex, bisetose; paraglossae broad, almost twice as long



Figs 7-12. Aedeagus (lateral and dorsal view) of *Orthogonius* spp. 7-8. *O. himalayicus* sp. nov. 9-10. *O. dureli* sp. nov. 11-12. *O. longiphallus* sp. nov. Scale bar= 1 mm.

as ligula; labial palpomere 2 bisetose. Antennae rather long, extending beyond the base of elytra, pubescent from apical half of antennomere 4, antennomere 1 twice as long as antennomere 2, slightly longer than 3, much longer than antennomere 4. From apical half of antennomere 4 to 11 slightly and dorso-laterally dilated.

Pronotum transverse (W/L: 1.6), bordered at base and apex, basal margin obviously wider, widest at 2/3 from base; fore angles rounded and hind ones obtuse; lateral marginal bead rather wide, slightly reflexed; disc convex, surface with faint, irregular striae; median line distinct, basal foveae deep.

Elytra elongate ovate (L/W: 1.6), convex, shoulders broad but nearly rectangular, bordered at base, parallel-sided, apex subtruncate, outer angles roundly obtuse, inner angles broad (Fig. 2); intervals convex, intervals 2-8 subequally wide, odd intervals with faint punctures; interval 3 with three setiferous pores, basal one near stria 3, both middle and subapical ones near stria 2.

Legs stout, fore tibia slightly dilated at apex, outer angle sharp; hind legs slender, with length ratio of tarsomeres 1-4 as 1.0: 1.0: 0.7: 0.7; tarsomere 4 bilobed, claws pectinate.

Microsculptural mesh patterns moderately transverse on head and pronotum, isodiametric on elytra.

Male genitalia. The median lobe of aedeagus rather short, stout, gradually contracted towards apex, apex obtuse (Figs. 9-10).

Female. Unknown.

Remarks. This new taxon resembles to *O. schau-mi* Chaudoir, 1871, a species from Sri Lanka, but differs in the following characters: body larger, pronotum more transverse, lateral marginal bead wider and hind angles more rounded, prosternal process bordered at apex, and the median lobe of aedeagus more stout.

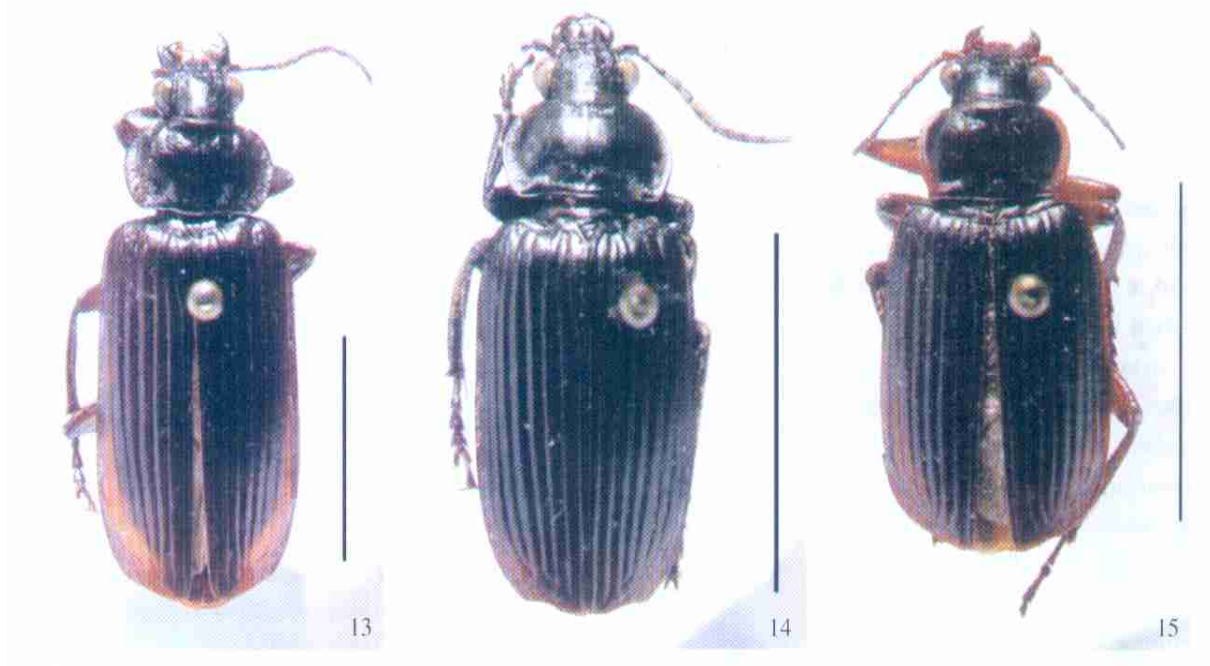
Holotype ♂, "British Bootan, Padong, L. Durel, 1914", in MNHN; paratypes: 1 ♂, same as holotype, in SCAU; 1 ♂, "Sikkim, India. Collection P. Dupuis", in IRSNB.

Etymology. Patronym, in honour of L. Durel, the collector of the type specimens.

Distribution. Bhutan. Known only from the type localities.

*Orthogonius longiphallus* sp. nov. (Figs. 3, 6, 11-12, 15)

Length: 15.0-16.0 mm, width: 5.0-5.5 mm.



Figs 13-15. Habitus of *Orthogonius* spp., holotype. 13. *O. himalayicus* sp. nov. 14. *O. durdi* sp. nov. 15. *O. longiphallus* sp. nov. Scale bars= 10 mm.

Prosternal process bordered at apex; sternite 7 with two pairs of setae on either side, apical margin hardly emarginate in male (Fig. 5).

Habitus as in Fig. 15.

Dark brown to black with antennae, palpi of mouthparts, legs, underside of thorax, lateral

marginal bead of pronotum, margins of sternites 5, 6 and 7 yellowish brown in the holotype, while whole body yellowish in the paratype.

Head moderately convex, eyes large, strongly prominent, surface with intricate wrinkles, neck as long as diameter of eye, clypeus bisetose, frontal impressions short and faint; ligula narrow, bisetose; labial palpomere 2 longer than apical one, bisetose in inner margin. Antennae long, almost reaching at the middle of elytra, pubescent from antennomere 4, antennomere 1 as long as 3, almost twice as long as 2, antennomeres 4 and 5 distinctly dilated.

Pronotum markedly transverse (W/L: 1.8), widest at middle, bordered at base and apex, apex wider than base, median line rather clear, basal foveae wide and shallow.

Elytra rather flat, elongate ovate (L/W: 1.6); scutellar striae long; shoulder rounded, parallel-sided, well bordered at base; striae deep, intervals convex, intervals 2 to 6 equally wide, interval 1 as wide as 7, intervals 3 with three setiferous pores which closed to striae 3, 2 and 2 respectively from base to subapex; apex of elytra obliquely contracted, inner angle obtuse (Fig. 3).

Fore and middle legs stout, fore tibia slightly dilated, outer angle moderate; hind legs slender, length ratio of hind tarsomeres 1-4 as 1.0: 0.8: 0.5: 0.4, apical margin of tarsomere 4 slightly emarginated; claws pectinate.

Prosternal process narrow, bordered at apex, sternites 7 emarginate at apex in male (Fig. 6).

Microsculptural mesh patterns isodiametric.

Male genitalia. The median lobe of aedeagus conspicuously long (comparing with its body), straight, with a small bead at apex (Figs. 11-12).

Remarks. In appearance this species is similar to *O. dispar* Bates, 1892 from Myanmar, but can be distinguished from the latter by: body broader, sternite 7 emarginate at apex in male, intervals 2 and 4 distinctly wider than 3 and 5, and aedeagus much longer and with a small bead-like raised at apex dorsally.

Holotype ♂, "Maria Basri, British Bootan", in MNHN. Paratype 1 ♂, same data as holotype, in SCAU.

Etymology. The name of this new species refers to the character state of the aedeagus.

Distribution. Bhutan. Known only from the type locality.

*Orthogonius opacus* Schmidt Göbel

Schmidt Göbel, 1846: 60; Andrewes, 1923: 34; Csiki, 1932: 1589.

*Orthogonius angusticollis* Schmidt Göbel, 1846: 61; Chaudoir, 1871: 122.

The types are preserved in the Prague Museum. This species has a quite wide distribution, ranged from Bhutan, Sikkim, India, Myanmar to Vietnam.

Material examined. 4 ♂♂, "British Bootan, L. Durel, 1914", "Museum Paris, ex coll. R. Oberthür" (MNHN); 1 ♂, "British Bootan, Padong, L. Durel, 1913" (MNHN); 1 ♂, "Maria Basti, British Bootang" (MNHN); 2 ♂♂, "British Bootang, Maria Basti, L. Durel" (MNHN); 7 ♂♂, "Pedong, A. Desgodins" (MNHN and SCAU); 1 ♀, "Laos. Xieng Khouang. V. 1919. R. V. de Salvaza", "*Orthogonius* sp.", "Brit. Mus. 1921-89"; 1 ♀, "Laos. Vientiane May 1917. R. V. de Salvaza", "Brit. Mus. 1921-89" (NHML).

#### Key to species of *Orthogonius* from Bhutan and Sikkim

1. Body ovate, not parallel at sides ..... *O. opacus*
- 1 Body elongate ovate, more or less parallel at sides ..... 2
2. Outer angle of fore tibia sharp, base of pronotum wider than apex, aedeagus short ..... 3
- 2 Outer angle of fore tibia obtuse, base of pronotum narrower than apex, aedeagus very long ..... *O. longiphallus* sp. nov.
3. Apical margin of sternite 7 rounded in male, prosternal process unbordered at apex, apex of elytron slightly emarginate and forming a rounded outer angle ..... *O. himalayicus* sp. nov.
- 3 Apical margin of sternite 7 emarginate in male, prosternal process bordered at apex, apex of elytron obliquely truncate ..... *O. dureli* sp. nov.

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viii+ 94 pp., 1-3 pls.

不丹和锡金直角步甲属种类（鞘翅目，步甲总科，直角步甲族）

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摘 要 直角步甲属 *Orthogonius* Macleay 在不丹和锡金原记  
录仅 1 种，即卵直角步甲 *O. opacus* Schmidt Göbel, 本文补  
充了该种的一些分布记录，并描述了产自不丹和锡金的直角  
步甲属 3 新种，即喜直角步甲 *O. himalayicus* sp. nov.、杜

氏直角步甲 *O. durdi* sp. nov. 和长茎直角步甲 *O.*  
*longiphallus* sp. nov., 给出了该地区直角步甲属分种检  
索表。

关键词 鞘翅目，步甲总科，直角步甲族，直角步甲属，新种，不丹，锡金.

中图分类号 Q969. 48

新书介绍

Illustrated Catalogue of the Genus *Carabus* of the World (Coleoptera, Carabidae)

Thierry Deuve 博士（法国国家自然历史博物馆，巴黎）撰写的 Illustrated Catalogue of the Genus *Carabus* of the World  
(Coleoptera: Carabidae) 于 2004 年由 Pensoft. Sofia Moscow 出版。

该书系统地总结了鞘翅目步甲科 Carabidae 步甲属 *Carabus* 昆虫系统学方面的研究成果，共 461 页，24 个图版。其内容分  
3 个部分：1) 形态学 (Morphology)，分别对步甲属昆虫成虫和幼虫的形态特征进行了描述；2) 系统学 (Systematics)，主要  
讨论步甲属昆虫系统发育和分类研究现状和存在的问题，对近年步甲属分子系统学的研究进展及其意义重点进行了评述；3)  
名录 (Catalogue)，根据作者提出新的分类系统，列出了世界全部已知步甲属昆虫种类（共 853 种，其中我国产种类近 400 种）  
的详细名录（含种名、亚种名、异名和分布等）。书后附有各阶元（collective names, genus names 和 species group names）的索  
引。

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